

Textural and compositional evidence for magma mixing in Chaoshan dioritic porphyry in Tongling area, Anhui, China

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The Chaoshan intrusion in Tongling area, within the uplift of lower Yangtze depression in the northeastern margin of Yangtze Plate in geotectonic, is a small apophysis of late Mesozoic, and its lithology is grey black pyroxene monzodiorite porphyry. It is porphyritic, phenocrysts (0.5mm-7mm) are composed of plagioclase (about 15%), alkali feldspar (5-10%), clinopyroxene (15%), brown amphibole (10%), biotite (1-2%) and magnetite (1%), set in a phaneritic anhedral groundmass (47%) of plagioclase, alkali feldspar, pyroxene and opaque minerals (15%). The accessory mineral is apatite. The disequilibrium textures in the Chaoshan intrusion, including the An-rich plagioclase resorbed core, acicular apatite inclusion zone in plagioclase, resorbed pyroxene core, spike zone in the plagioclase, resorbed more sodic plagioclases included by the zoned plagioclases, and so on, are consistent with the magma mixing model. The authors have studied the composition of its feldspar with complex resorption and overgrowth from core to rim by electronic probe.

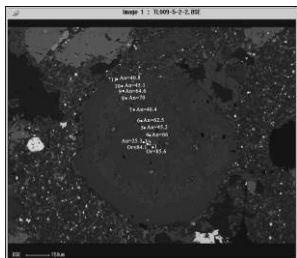


Figure 1: BSE photograph of feldspar from Chaoshan pyroxene monzodiorite porphyry. White electronic probe spot and corresponding composition are given.

K-feldspar relict (without quartz relict) in plagioclase core and subsequent dramatic change in plagioclase composition are compatible with the mixing between evolved basaltic magma derived from mantle asthenosphere and K-rich trachytic magma formed in the lower crust. Quenching results in the epitaxial nucleation of sodic plagioclase on K-feldspar. Three abrupt Ca-rich overgrowths coupling with FeO content variation after resorption of sodic plagioclase can be attributed to three recharges of the same magma chamber by basaltic magma and their mixing [1].

Geochronology and petrogenesis of late-Variscan plutonism (NW Portugal): Synthesis and inferences on crustal recycling and growth

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In NW Portugal large volumes of granitoids were emplaced during the post-collisional stage of the Variscan orogeny. This was the main period of successive granite generation, which exhibit different chemical and isotopic signatures. Geochronological and petrogenetic results are presented and inferences on the geodynamic evolution of the Iberian Variscides are discussed.

During the last ductile deformation phase D3 (320-300 Ma) successive highly peraluminous magmas were generated from metasedimentary middle/lower-crustal sources with a major pelitic contribution, giving rise to the two-mica leucogranites. In the syn- and late-D3 periods (320-305 Ma) moderately peraluminous monzogranites and granodiorites of aluminopotassic affinity were also produced. An origin by partial melting of metagraywackes and/or felsic metagneous lower crust materials is proposed. During these periods a large amount of hybrid magmas are generated by the interaction of these crust-derived liquids and a mantle-derived magma (equivalent to the outcropping shoshonitic gabbroic rocks) yielding an enriched isotopic signature. Slightly peraluminous monzogranites and granodiorites of calc-alkaline and Mg-K subalkaline affinities were produced by crystallisation of these hybrid magmas. Significant changes occurred at about 300 Ma. Extensional processes controlled the emplacement of Fe-K subalkaline granites (290-299 Ma). They are meta- to peraluminous, have evolved chemical compositions and display a mantle-like isotopic signature. An origin by mantle input followed by mantle-crust interaction is proposed, implying the contribution of a less enriched mantle component than that involved in the genesis of the hybrid Mg-K subalkaline granitoids.

In the Central Iberian Zone an extensive crustal recycling event occurred at the post-collisional stage of the Variscan orogeny (290-320 Ma). The abundance of hybrid granitoids implying a significant input of juvenile magmas also indicates the occurrence of important crustal growth episodes together with the recycling processes.

[1] Ginibre *et al.* (2007) *Elements* **3**, 261-266.